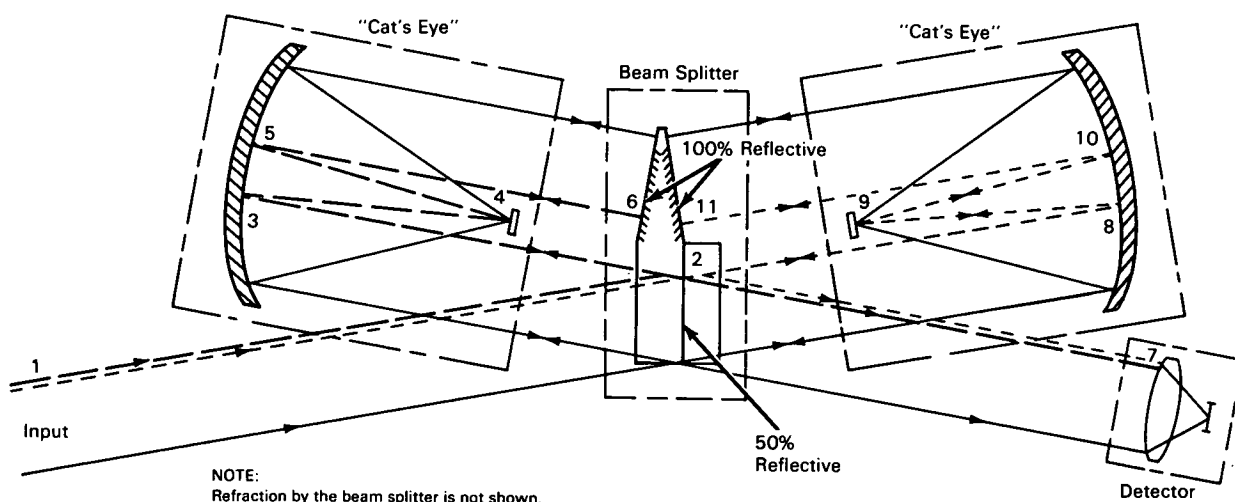


NASA TECH BRIEF



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Interferometer Construction Assures Parallelism of Critical Components



The problem: To design an interferometer in such a way that parallelism of the critical components is assured even if the total instrument is subjected to mechanical stresses intolerable in other interferometers.

The solution: An interferometer whose principal components are so rigidly mounted that effective operation is possible even though the base of the total instrument is subjected to flexing or twisting torques.

How it's done: The interferometer consists of two identical parabolic reflectors called "cat's eyes", a beam splitter, and a detector including either an eyepiece for viewing or a photographic plate for recording. Each "cat's eye" consists of a parabolic reflector focused on a small plane mirror, with the two components immovably mounted in a cylindrical housing, thus guaranteeing rigidity. One "cat's eye" with its

housing assembly is rigidly mounted on the instrument base and the other is mounted on a track that permits axial motion. The wedge-shaped beam splitter is preferably formed from a single glass blank so that each section has the same optical thickness. The sloping sides are coated with gold, yielding 100% reflectivity. The remaining section is coated to provide 50% reflectivity and 50% transmittivity. In operation, the upper ray starts at point 1 and progresses to point 2, where it is split into two rays, one transmitted and the other reflected. The path of the transmitted ray, indicated by short dashes, is: 1, 8, 9, 10, 11, 10, 9, 8, 2, 7 (detector). The path of the reflected ray, indicated by long dashes, is: 1, 2, 3, 4, 5, 6, 5, 4, 3, 7 (detector). Both rays originate as the same ray and follow the same final path to the detector, causing interference. The interference patterns produced are similar to those formed by the Michelson interferometer.

(continued overleaf)

Notes:

1. If system alignment is accurate, circular fringes are produced; if the movable "cat's eye" is misaligned, curvilinear fringes are produced. So long as any part of the input beam follows two paths, useful interference fringes are produced.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California, 91103
Reference: B65-10292

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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